COPY OF THE ORIGINAL

INSTRUCTION MANUAL

Inductive coupler system

M30 IOL

Preliminary

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Version: P3
Language: English

SMW AUTOBLOK

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INSTRUCTION MANUAL
Inductive coupler system M30 IOL

Validity:

0E011604	Inductive coupler M30 IOL Base	11.07.2023	V2	EN
0E011605	Inductive coupler M30 IOL Remote	11.07.2023	V2	EN

Thank you for purchasing your M30 IOL inductive coupler system..

This **instruction manual** contains the installation, the functional description and the operation of the **„M30 IOL"**.

SMW-AUTOBLOK reserves the right to make **changes without notice**.

This **instruction manual is a part of the „M30 IOL "** and must be passed to the new owner in case of sale.

This **instruction manual may not be** -in whole or in part- **copied** without our written agreement.

Please read the instruction manual carefully before installation and use and always follow the regulations.

Please note especially the sections which are marked with the following signs:

- **Danger of injury or danger to life if instructions are not followed.**
- **Danger of damage to the coupler, the machine or the components.**

General safety instructions

 **Danger!**

 **Danger to the environment!**

 **General precept sign!**

 **Follow the instructions!**

 **General warning sign!**

 **Caution: Hot surface!**

 **No access for persons with pacemakers**

1. Intended use

The device is designed to transmit energy and signals without contact. The system must not be used in applications where the safety of persons depends on the device function.

Liability claims against the manufacturer expire in the event of damage caused by:
- unauthorized tampering
- use not in accordance with the intended purpose
- use, installation, handling contrary to the regulations of these operating instructions.

2. Authorized personnel

Installation and commissioning are only permitted by trained specialist operators.

3. Visual inspection

Please check the product for visible damage prior to use!

4. Duties of the operator

The operator must ensure that the locally applicable national and international safety regulations are observed. The unit may only be operated with an approved power supply.

5. Operating faults

In case of defective and unrecoverable device malfunctions, put the device out of operation and secure it against unauthorized use.

6. Caution: Hot surface!

Danger of burns from hot surfaces!
The active surface heats up even under normal operating conditions.
Keep hands and objects away from the active surface.
Avoid contact of metallic objects on the active surface.
Fire hazard!

7. Protection against electromagnetic fields during operation and assembly

The permissible values according to VDE 0848 Part 3-1 are observed from a distance of > 3 mm. Persons with physical aids (e.g. pacemakers) may be exposed to health hazards due to the magnetic fields emitted by the coupler system. The minimum distance for this group of persons is > 5 mm. The operator must ensure that this minimum distance is also maintained during operation by taking suitable measures.

8. Certification

With the CE mark we confirm that our products comply with the requirements of the EC Directives 2004/108/EC (EMC) and the EMC Act.
In an accredited EMC laboratory, proof was provided that the products meet the EMC requirements of the basic technical standards:
- EN 61000-6-4 (emitted interference) and
- EN 61000-6-2 (immunity to interference)

In case of doubts or questions please ask SMW-AUTOBLOK or one of our authorized offices.

Before the start up, the operating instructions must be read carefully.

M30-IOL

Axial coupler

Inductive Coupling Sytem

■ **Contact free transmission of energy and signals**

IO-Link

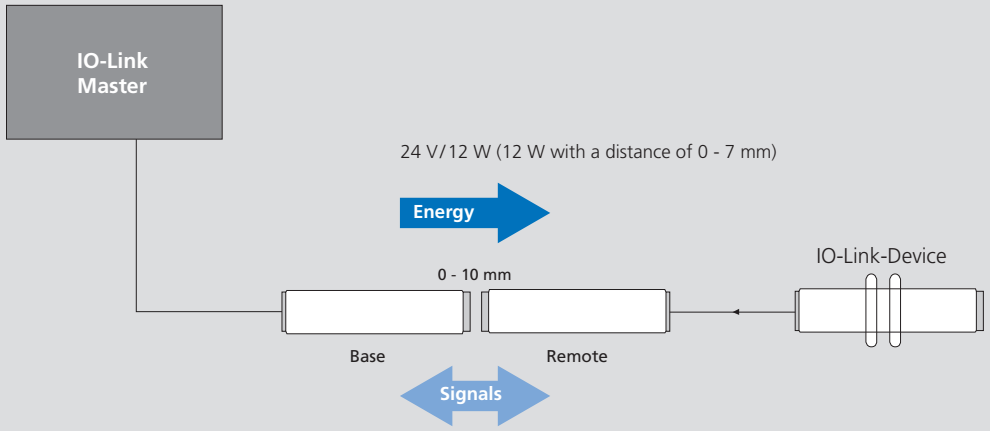
Application/customer benefits

- Contact free, safe transmission of energy and signals between moving / rotating and stationary components
- Application examples: Supply of sensors, Supply and monitoring of remote systems
- Dynamic Pairing
- Wear and maintenance free
- Protective function: Temperature monitoring, foreign object detection, reverse polarity protection
- Multi-level LED with good visibility

Technical features

- Mounting M30 x 1.5
- Operating voltage 24 V (18 ... 30 V)
- Transmission distance 0 - 10 mm
- Transmission of energy: 24 V / 12 W (500 mA) with a distance of 0 - 7 mm
- Transmission of signals: IO-Link (COM1, COM2, COM3), 1 digital signal
- Connection: Base male connector M12 (5-pin), remote female connector M12 (4-pin)
- Protection class IP 67
- Id. No. Base: 0E011604, Id. No. Remote: 0E011605

Block diagram:



Subject to technical changes.
For more detailed information please ask our customer service.

IO-Link

Function Base	
LED Power	
Color	Green / red
Function	Off » Unit not supplied with voltage (or undervoltage)
	On (green) » 24 V ok and mobile unit has been detected
	Flashes 2 Hz green » 24 V ok but no mobile unit detected
	Flashes 1 Hz red / green » Incompatible mobile unit detected
	Flashes 2 Hz red » Foreign object detected
	Flashes 5 Hz red » Internal error
LED IO-Link	
Color	Green /yellow
Function	Green » Signals IO-Link Operation
	Green » On (SIO Mode Signal on)
	Green » Off (SIO Mode Signal off)
	Flashes 2 Hz red » Short circuit at the IO-Link PIN
	Flashes 5 Hz red » Overload voltage output remote unit
LED Signal	
Color	Yellow
Function	Off » Digital input is not connected or no mobile unit detected
	On » Digital input is connected
	Flashes 2 Hz » Digital input is connected but short circuit at the output
	Flashes 5 Hz » Overload voltage output mobile unit

Function Remote	
LED Power	
Color	Green / red
Function	Off » Unit is not connected
	On (green) » Unit coupled, voltage output DC 24 V ok
	Flashes 2 Hz red » Connected but short-circuited at DC 24 V
	Flashes 5 Hz red » Internal error
LED IO-Link	
Color	Green / yellow
Function	Green » Signals IO-Link operation according to IO-Link specification (1000 ms on / 100 ms off)
	Green » On (SIO Mode Signal on)
	Green » Off (SIO Mode Signal off)
	Flashes 2 Hz red » Short circuit at the IO-Link PIN
	Flashes 5 Hz red » Overload voltage output mobile unit
LED Signal	
Color	Yellow
Function	Off » Digital input 2 is not connected or no mobile unit detected
	On / yellow » Digital input 2 is connected

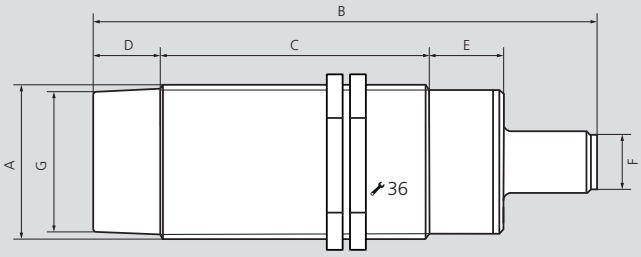
Inductive Coupling System

■ Stationary Unit - Base
■ Mobile Unit - Remote

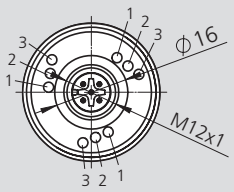
M30-IOL

Axial coupler

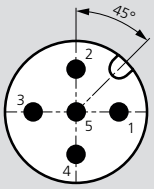
Base / Remote



Display Base LED

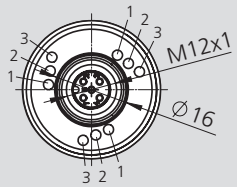


Base

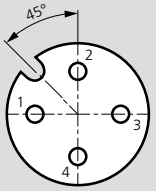


Male connector 5-pin
M 12 x 1

Display Remote LED



Remote



Female connector 4-pin
M 12 x 1

Number	LED	Color
1	Power LED	Green / Red
2	Signal LED	Yellow
3	IOL LED	Yellow / Red

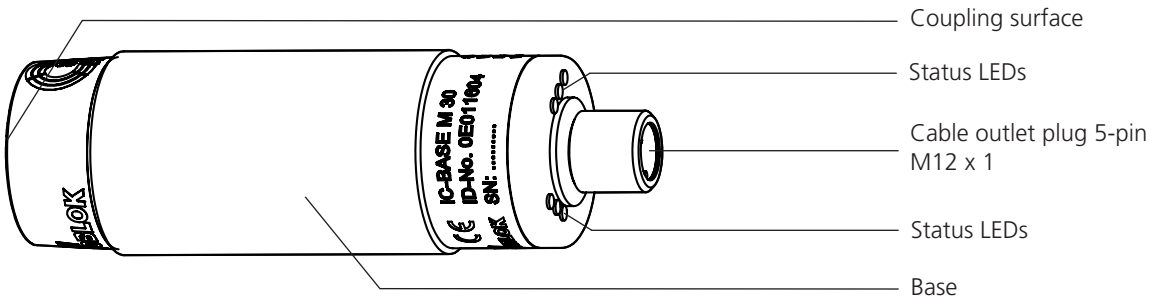
Subject to technical changes.
For more detailed information please ask our customer service.

Inductive coupling system M30-IOL			
SMW-electronics Type		**Base**	**Remote**
Id. No.		**0E011604**	**0E011605**
A	mm	M30 x 1.5	
B	mm	96	94
C	mm	52	
D	mm	13	
E	mm	18	
F	mm	M12 x 1 / Male	M12 x 1 / Female
G	mm	Ø 27	
Housing material		CrNi, PA66, PC GF30%	
Protection class		IP 67	
Operating temperature		-20°C ... +50°C	
Storage temperature		-20°C ... +80°C	
Transmission distance		0 mm ... 10 mm (12 W: 0 mm ... 7mm)*	
Operating voltage		24 V (18 ... 30 V)	-
Output voltage		-	24 V ± 10% DC
Power consumption (Base)		1500 mA	-
Power output (Remote)		-	500 mA
Overload protection / short circuit protection		✓	✓
Residual ripple		-	< 200 mV
Reverse polarity protection		✓	-
Temperature monitoring		✓	✓
Data-Valid Output		150 mA	-
Ready delay		< 600 ms	

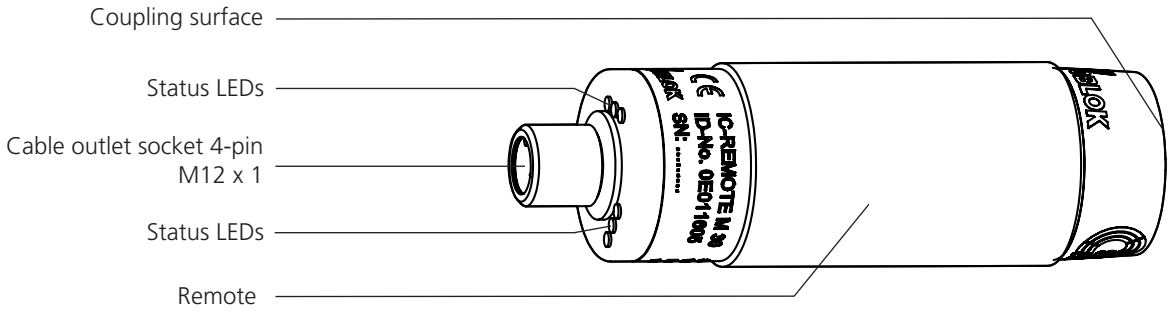
PIN assignment	PIN	Signal Base	Signal Remote
Supply voltage	1	24 V IN	24 V OUT
Digital signal	2	0/24 V OUT	0/24 V IN
Ground	3	GND	GND
IO-Link Signal	4	IO-Link CQ	IO-Link CQ
Data-Valid	5	DAV 24 V	-

* V in ≥ 22 V Base

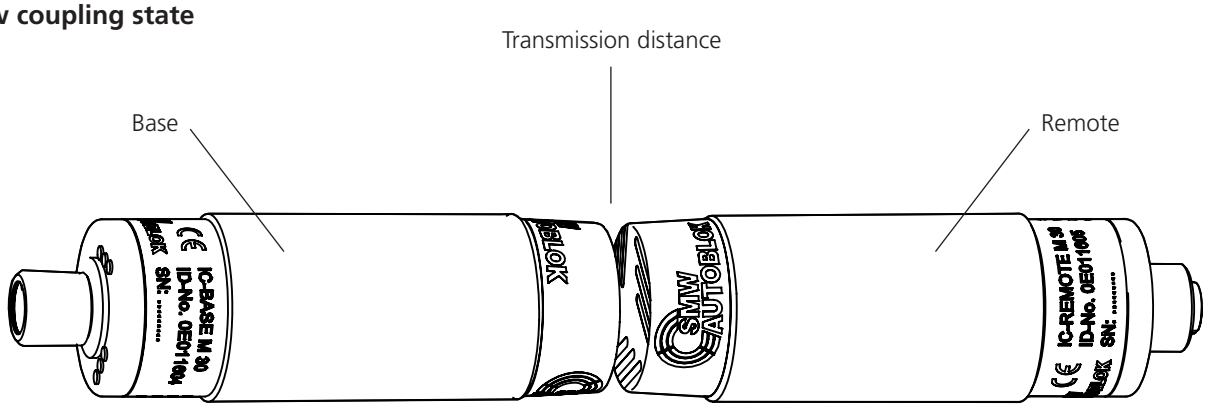
View Base



View Remote



View coupling state



Description

The inductive coupling system M30-IOL is used to operate electronic components of automation technology such as IO-Link hubs, sensors or actuators on mobile, dynamically variable or rotating units in machine and device parts.

A contactless bilateral fully transparent IO-Link signal transmission takes place between a stationary unit (base) and a mobile unit (remote). The IO-Link protocol is transmitted without restrictions (COM1, COM2, COM3), so that no parameter settings are required for the inductive coupling system. This means that no device-specific IODD is required.

In addition to signal transmission, electrical energy is also transmitted without contact to the mobile unit (remote) for the power supply of sensors or actuators.

The M30-IOL inductive coupling system consists of a stationary unit (base) and a mobile unit (remote), each of these units are equipped with an M30 mounting fixture. Both units are to be mounted axially facing each other at a distance of 0 to 8 mm from the coupling surface. The manufacturer recommends the use of metal angle brackets for mounting the system (available from the manufacturer).

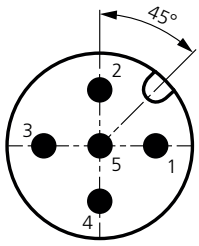
An integrated coil system ensures the transmission of the energy and the signals on a contactless inductive principle.
The transmission is independent of whether there is a rotating movement of the mobile unit or not. The transmitted IO-Link signal is usually passed on from the stationary unit (base) to the control component.
In addition, the system has all the usual protective functions (temperature protection, reverse polarity protection) and it is protected according to IP 67.

The system is designed as a plug and play solution, so that integration into the customer's system is possible with minimal effort. All important interfaces are designed to be detachable, so that replacement during maintenance and service is possible without delay.
The stationary and mobile units are compatible and interchangeable (dynamic pairing).

The electrical and mechanical interfaces for the individual function units are described in the following chapters.

Power connection / Signal connection

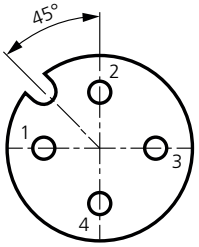
Plug Base



Male connector 5 pin

Pin	Anschlussbelegung	Signal Base
1	Supply voltage	24 V IN
2	Digitalsignal	0/24 V OUT
3	Ground	GND
4	IO-Link Signal	IO-Link CQ
5	Data-Valid	DAV 24 V

Plug Remote

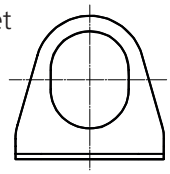


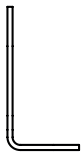
Female connector 4-pin

Pin	Anschlussbelegung	Signal Remote
1	Supply voltage	24 V OUT
2	Digitalsignal	0/24 V IN
3	Ground	GND
4	IO-Link Signal	IO-Link CQ
5	Data-Valid	-

Mounting

Mounting bracket



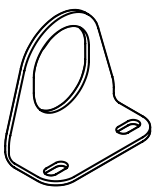


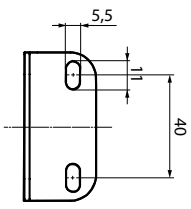
Assembly mounting bracket

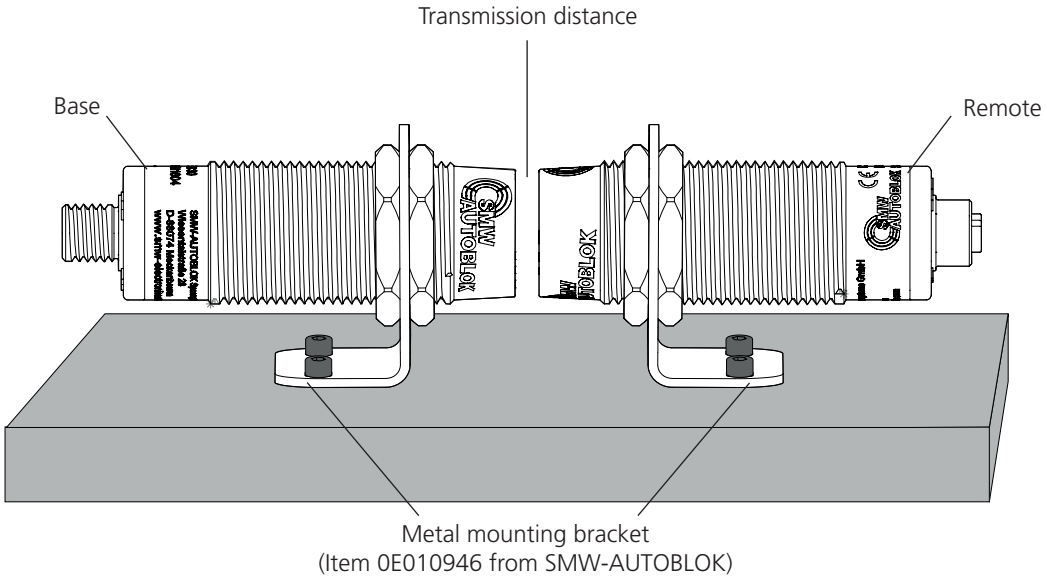
For mounting the coupler

item 0E010946 from SMW-AUTOBLOK.

Views







Recommended: Metal mounting for optimum thermal conductivity

Notice

Use base coupler 0E011604 only with remote coupler 0E011605.

The start-up can only occur after the entire transmission chain of base and remote has been comletely set up. The installation of the components must always be performed in a (electrical) power-free state.

A correct coupling between Base and Remote is indicated by the Data Valid signal.

Caution

The housing can heat up strongly during operation.
Risk of burning due to hot housing surfaces.

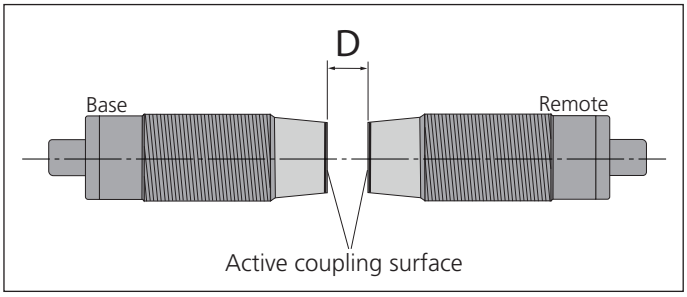
- Protect the housing against contact with flammable material.
- Protect the housing from accidental contact.

Integration

The base and remote units of the contactless transmission are integrated by mounting them in axial alignment in compliance with the installation specifications. The assembly must be performed in a (electrical) power-free state. The following sections describe valid installation instructions that must be strictly followed for correct operation.

The manufacturer recommends to operate the inductive coupling system with a coupling distance between base and remote unit of 0 to 4 mm.

Distance to each other



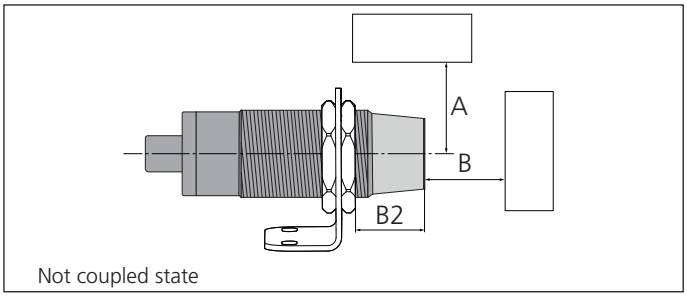
Operating voltage 18 ... 30 V

Distance D ≤ 10 mm

Installation in metall

Attention!

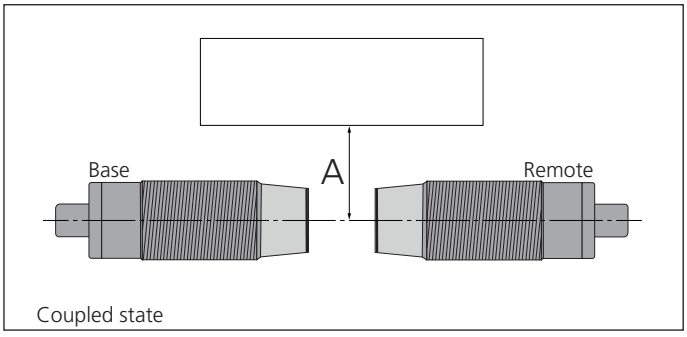
Metal objects in the area near the active coupling surfaces can heat up strongly due to the magnetic field generated by the coupler. Therefore, the specified minimum distances must be strictly followed when installing in metal.



Distance A ≥ 40 mm

Distance B ≥ 20 mm

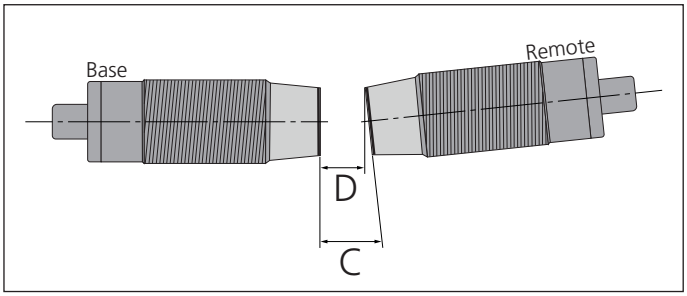
Distance B2 > 15 mm und < 30mm



Distance A ≥ 40 mm

Permissible angle offset

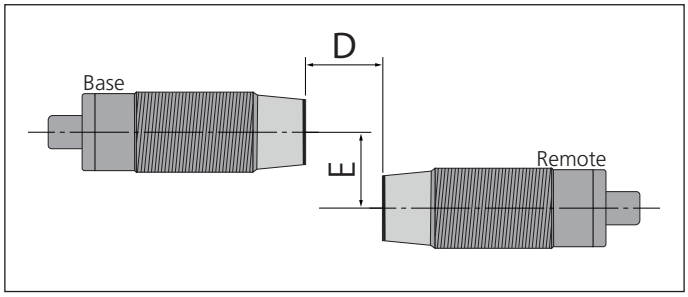
The permissible angle offset allows function in special mounting positions.



Distance D	Angle ° C
1 mm	< 25°
2 mm	< 20°
3 mm	< 15°
8 mm	< 10°

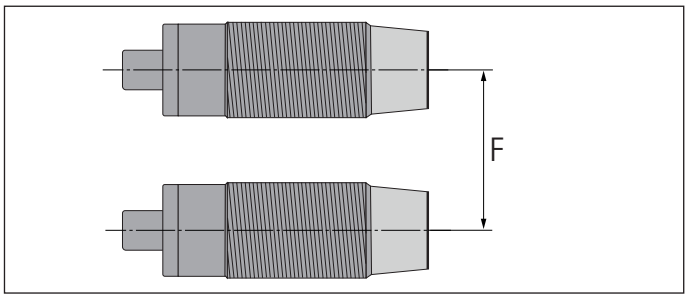
Permissible side offset

The maximum side offset between base and remote unit is ±3 mm.



Side offset E	Distance D
E < 3 mm	bei D = 3 mm
E < 1 mm	bei D = 8 mm

Interference with each other



Distance F > 50 mm

Attention!

The parameters like enviroment temperature, distance, angle offset and side offset can affect the amount of energy transfer.

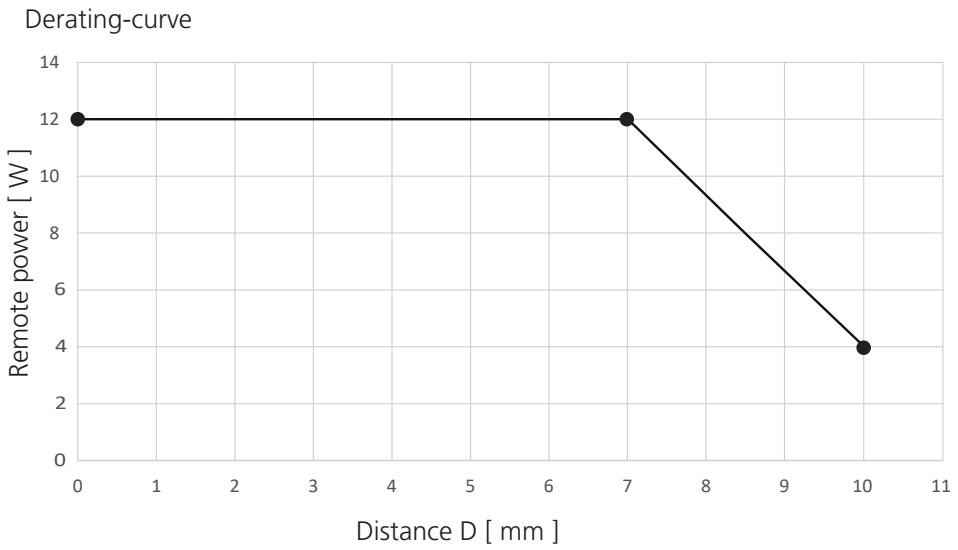
The inductive coupling system works optimally with the maximum power centrically at D = 0 to 4 mm.

Attention!

No liability in case of damage to the coupling surfaces caused by the use of the product, for example as a result of insufficient cleanliness. If the coupling surfaces are subject to contamination during operation, suitable action (blowing air and / or flushing) must be performed.

Derating energy transmission

To increase the maximum power that can be transmitted and the maximum distance over which the coupling system can transmit, the ambient temperature, distance, lateral axis offset and angular offset can be reduced. In addition, the transmission distance of the coupling system can be increased with lower power requirements.



The figure represents the usual transmittable energy in relation to the transmission distance D (without offset).

The measurements for the derating curve were made without angular deviation, and the results of the curves can be considered as normally expected values.

Notice!

The permanent transmittable power of the system decreases depending on the increase of the ambient temperature. To avoid damage due to overheating, power and data transmission is interrupted if the temperature is too high.

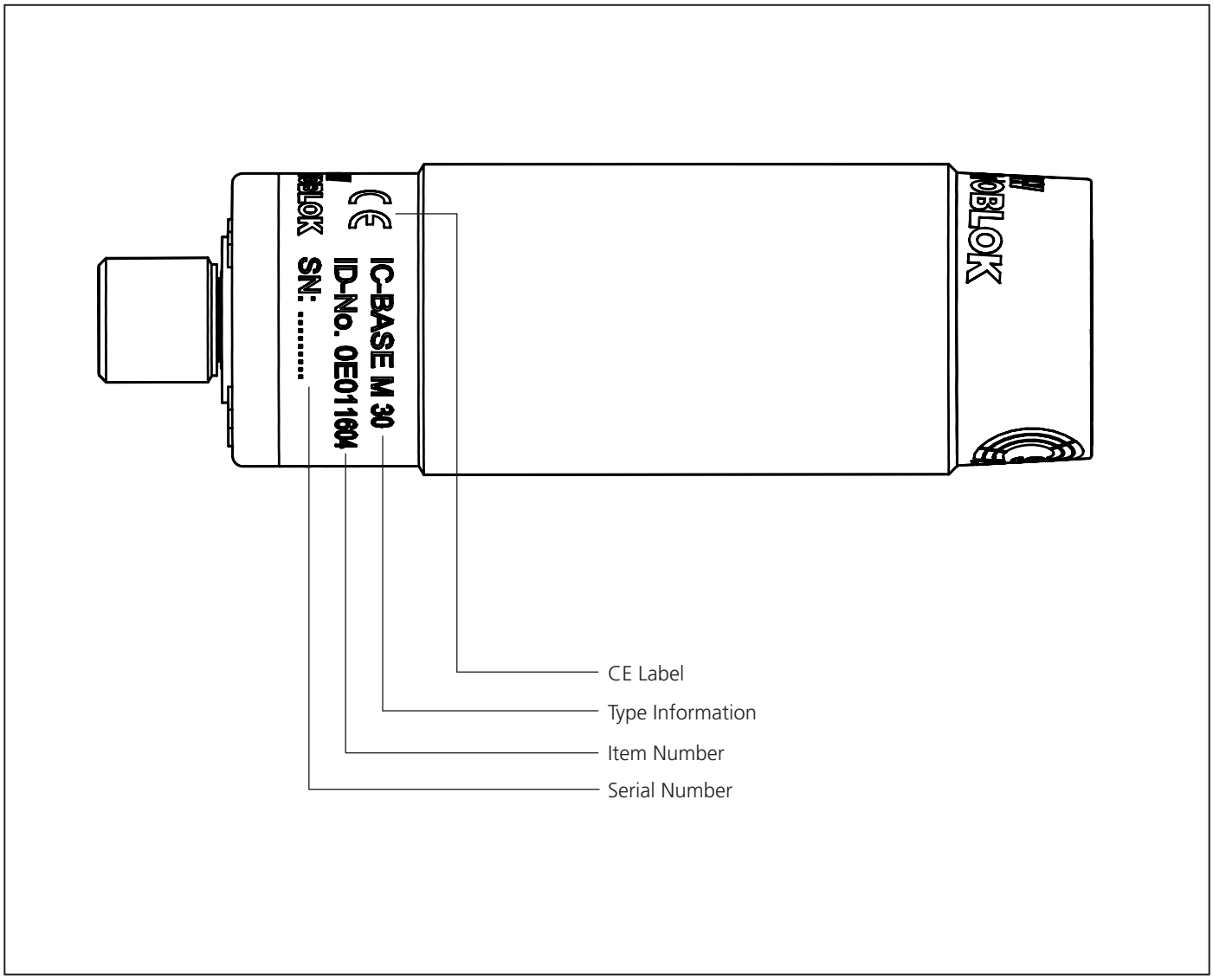
Notice!

At a higher ambient temperature value and an increased average output current, a longer output result at the remote can be reached by cooling down (for example with the help of a heat sink or by mounting on a material which has a good thermal conductivity).

Typeplate

Typeplate and contact

If you have any questions about the product or if you wish to place order, please specify the type and item number on the typeplate of the inductive coupling system.



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12 months warranty

Product: **Inductive coupler system M30 IOL**

SMW-AUTOBLOK guarantees the proper function of the inductive coupling system, if the operation and storage are in accordance with the technical specifications of this operating manual.

In the case that the inductive coupling system does not meet the specified requirements and values, after checking the facts, repair or replacement will be carried out.

In case of production defects, the inductive coupling system will be repaired free of charge within the warranty period.

The warranty period will be 12 months starting from the date of purchase.

In order to maintain the warranty, the return must be carried out in the original packaging.

In addition, a description of the malfunction must be included.

The manufacturer otherwise retains the right not to admit warranty claims.

Notes

Notes

Notes

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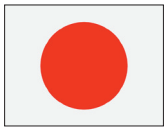

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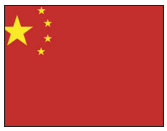

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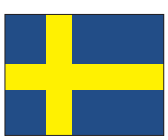

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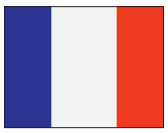

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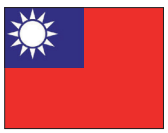

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